

REMARKS

Reconsideration of the above-identified application in view of the present amendment is respectfully requested.

Claim 8 has been rejected as indefinite. Claim 8 has been amended to depend from claim 7, thereby overcoming this rejection.

Claims 1-5 and 8-10 have been rejected as unpatentable over Pfenninger, Jr. et al., U.S. Patent No. 2,674,505 in view of Cartwright et al., U.S. Patent No. 5,678,454. Claims 6-7 have been rejected as unpatentable over Pfenninger, Jr. et al. in view of Cartwright et al. and Kidzun et al., U.S. Patent No. 5,632,562.

Regarding the rejection of claim 1, if a proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. MPEP §2143.01. Cartwright et al. discloses a steering column (10) with bearings (34) interposed between an input shaft (16) and a housing (32). As is known in the art, a tight fit between the bearings, the input shaft, and the housing is desirable.

Pfenninger et al. discloses a bearing that permits radial and axial movement between a shaft (16) and another member (17) (Col. 1, lines 1-7; Col. 3, lines 4-7 and 25-30). To utilize the movable bearing of Pfenninger et al. with the vehicle steering column of Cartwright et al. would render Cartwright et al. unsatisfactory for its intended purpose.

Regarding the rejection of claims 6-7, Kidzun et al. discloses a ring (8) having a plurality of radially-spaced, axially extending ridges (9, 10) (Figs. 2, 3 and 6). It is respectfully submitted that only hindsight reconstruction of the claimed steering column could lead one of ordinary skill in the art to combine features of the axially extending ridges of Kidzun et al. with the annular ridges (23, 24) of the bearing of Pfenninger et al.

Amended claim 1 recites the bearing having an inner race engaging the input shaft and an outer race (Specification, page 13, lines 19-24), the gasket being made from a resilient material (Specification, page 14, lines 8-9) and interposed between the outer race of the bearing and the ribs (Fig. 1), the gasket comprising a tubular member encircling the outer race of the bearing, the gasket having a cylindrical inner surface and an outer surface (Specification, page 15, lines 9-20), the inner surface engaging the outer race of the bearing (Fig. 1), and the outer surface engaging the ribs, the gasket having portions interdigitated with the ribs to resist relative axial movement between the gasket and the housing (Specification, page 15, lines 9-20). Pfenninger, Jr. et al. discloses a bearing having both inner (24) and outer (23) ribs and an inner ring member (18) engaging the elastic material (22), not the outer race (11) of the bearing engaging the elastic material (Fig. 1). It is respectfully submitted that Pfenninger, Jr. et al. and the other art of record do not disclose or suggest a vehicle steering column with these and

the other claimed features. Claim 1 is in condition for allowance.

Claim 3 recites each rib having a width in the range of 0.068 inches to 0.078 inches. The Office Action states that that this limitation is a matter of engineering design choice and the level of ordinary skill in the art would produce a similar optimization. It is respectfully submitted that this limitation has been arrived at by deliberate experimentation.

Applicant has found that ribs thinner than 0.068 inches result in the gasket being cut by the ribs and the vehicle steering wheel feeling loose to the operator (See Specification, pages 1-2, lines 17-19 and 1-18). Ribs wider than 0.078 inches have been found to not completely penetrate the gasket and thereby ineffectively secure the gasket between the ribs and the bearing, resulting in "walk-out" of the gasket (See Specification, pages 1-2, lines 17-19 and 1-18). The width range of the ribs has been carefully chosen and is not a mere design choice.

Claim 5 recites each rib having a height in the range of 0.025 inches to 0.035 inches. The Office Action states that that this limitation is a matter of engineering design choice and the level of ordinary skill in the art would produce a similar optimization. It is respectfully submitted that this limitation has been arrived at by deliberate experimentation.

Applicant has found that ribs taller than 0.035 inches result in the gasket being cut by the ribs and the vehicle

steering wheel feeling loose to the operator (See Specification, pages 1-2, lines 17-19 and 1-18). Ribs shorter than 0.025 have been found to not sufficiently penetrate the gasket and thereby ineffectively secure that gasket between the ribs and the bearing, resulting in "walk-out" of the gasket (See Specification, pages 1-2, lines 17-19 and 1-18).

Claim 6 recites each rib having a flat peak with an axial length in the range of 0.012 inches to 0.022 inches. The Office Action states that this limitation is a matter of engineering design choice and the level of ordinary skill in the art would produce a similar optimization. It is respectfully submitted that this limitation has been arrived at by deliberate experimentation.

Applicant has found that flat peaks with an axial length less than 0.012 inches result in the gasket being cut by the ribs and the vehicle steering wheel feeling loose to the operator (See Specification, pages 1-2, lines 17-19 and 1-18). Flat peaks longer than 0.022 inches have been found to not sufficiently penetrate the gasket and thereby ineffectively secure that gasket between the ribs and the bearing, resulting in "walk-out" of the gasket (See Specification, pages 1-2, lines 17-19 and 1-18).

Claim 7 recites each rib having a flat valley with an axial length in the range of 0.012 inches to 0.022 inches. The Office Action states that that this limitation is a matter of engineering design choice. It is respectfully submitted that this limitation has been arrived at by deliberate experimentation.

Applicant has found that ribs with valleys having an axial length greater than 0.022 inches result in too few ribs securing the gasket. Rib valleys shorter than 0.012 inches have been found difficult to form by conventional methods. The valley length range of the ribs has been carefully chosen and is not a mere design choice.

Claim 8 recites each rib having side surfaces that extend at an angle of 57 degrees. The Office Action states that that this limitation is a matter of engineering design choice and the level of ordinary skill in the art would produce a similar optimization. It is respectfully submitted that this limitation has been arrived at by deliberate experimentation.

Applicant has found that side surface angles greater than 57 degrees result in the gasket being cut by the ribs and the vehicle steering wheel feeling loose to the operator (See Specification, pages 1-2, lines 17-19 and 1-18). Angles less than 57 degrees have been found to not sufficiently penetrate the gasket and thereby ineffectively secure the gasket between the ribs and the bearing, resulting in "walk-out" of the gasket (See Specification, pages 1-2, lines 17-19 and 1-18). The side surface angle of the ribs has been carefully chosen and is not a mere design choice.

Claim 11 recites the ribs of the housing and the interdigitated portions of the gasket are abutting and are not adhesively adhered to each other, and the gasket is made of neoprene. (Specification, page 14, lines 8-9, page 15, lines 9-20). It is respectfully submitted that Pfenninger, Jr. et al. and the other art of record do not disclose a

vehicle steering column with this and the other claimed features.

Claim 12 recites the cylindrical inner surface of the gasket abuts the inner race of the bearing. (Specification, page 14, lines 20-22). Pfenninger, Jr. et al. discloses a ring-like member (18), not the elastic material (22), abutting an outer race (11) of the bearing (Col. 3, lines 10-15). It is respectfully submitted that Pfenninger, Jr. et al. and the other art of record do not disclose a vehicle steering column with this and the other claimed features.

Claim 13 recites the bearing is secured against axial movement relative to the input shaft. The bearing of Pfenninger, Jr. et al. allows axial and radial play. It is respectfully submitted that Pfenninger, Jr. et al. and the other art of record do not disclose a vehicle steering column with this and the other claimed features.

Claim 14 recites each rib in the series of ribs has a width and a height, the width being in the range of 0.068 inches to 0.078 inches, the height being in the range of 0.025 inches to 0.035 inches, each rib having a flat peak with an axial length in the range of 0.012 to 0.022 inches; each annular groove having a flat valley forming a bottom surface of a cavity, the valley having an axial length in the range of 0.012 to 0.022 inches; and each rib of the series of ribs having side surfaces that extend from the bottom surface at an angle of approximately 57 degrees. As stated above regarding claims 2-8, Pfenninger, Jr. et al. and the other art of record

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do not disclose or suggest a vehicle steering column with these and the other claimed features.

Claim 1, as well as claims 2-14 which depend from claim 1, are in condition for allowance.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "Version with markings to show changes made."

In view of the foregoing, allowance of the above-identified application is respectfully requested.

Please charge any deficiency or credit any overpayment in the fees for this amendment to our Deposit Account No. 20-0090.

Respectfully submitted,



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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Claims 1 and 8 have been amended, as follows:

1. (Amended) A vehicle steering column comprising:

an axially extending input shaft for connecting to a vehicle steering wheel, the input shaft being rotatable about an axis upon rotation of the steering wheel;

a housing at least partially enclosing the input shaft;

a bearing ~~being~~ interposed between the housing and the input shaft and supporting the input shaft for rotation about the axis, the bearing having an inner race engaging the input shaft and an outer race;

the housing having at least one series of axially spaced, annular ribs that at least partially extend around the axis of the input shaft and around the outer race of the bearing, axially adjacent annular ribs being separated by an annular groove; and

a gasket made of resilient material ~~being~~ interposed between the outer race of the bearing and the ribs, the gasket comprising a tubular member encircling the outer race of the bearing, the gasket having a cylindrical inner surface and an outer surface, the inner surface engaging the outer race of ~~encircling~~ the bearing, and the outer surface engaging the ribs, the gasket having portions interdigitated with the ribs to resist relative ~~resisting~~ axial movement between ~~of the~~ gasket and the housing.

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8. (Amended) The vehicle steering column of claim 7 ±
further being defined by:

each rib of the series of ribs having side surfaces
that extend from the bottom surface at an angle of
approximately 57 degrees.

Claims 11-14 have been added.